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## THE CRICKETS OF ONTARIO.

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(Continued from page 144.)

### Subfamily GRYLLINÆ.

This subfamily includes the common field and ground crickets, and is represented in Ontario by two genera, *Nemobius* and *Gryllus*. These may be separated as follows :

- a. Small species; last joint of maxillary palpi twice as long as the one preceding; hind tibiæ furnished with long movable spines; first joint of hind tarsi unarmed above, or with one row of small teeth ..... *Nemobius*.
- aa. Medium-sized or large species; last joint of maxillary palpi but little, if any, longer than the one preceding; hind tibiæ armed with short immovable spines; first joint of hind tarsi sulcate above, with a row of teeth on each side ..... *Gryllus*.

### Genus NEMOBIUS.

This genus is best known by the common little striped ground cricket (*N. fasciatus*), which abounds in our fields and roadsides in late summer and autumn. Our other species are all much more local and less numerous in individuals, and are not likely to be taken by the collector unless he is specially looking for them.

#### Key to Ontario species of Nemobius.

- a. Ovipositor as long as or barely shorter than the hind femora, straight or nearly so.
- b. Ovipositor distinctly longer than hind femora, black or body arranged in lengthwise bars.
- c. Ovipositor a fourth longer than hind femora, colour light grayish, with distinct black markings; size medium or rather small ..... *N. griseus*, n. sp.
- cc. Ovipositor not more than about an eighth longer than hind femora, size large.

- d. Colour blackish or fuscous ; the dark stripes on occiput always visible, though sometimes indistinct in very dark specimens . . . . 2. *N. fasciatus*.
- dd. Colour light reddish-brown or grayish; without dark stripes on occiput . . . . . 3. *N. canus*.
- bb. Ovipositor no longer than hind femora; black of body scattered in blotches and dashes . . . . . 4. *N. maculatus*.
- aa. Ovipositor distinctly shorter than hind femora, usually more or less arcuate.
  - e. Small species ; tegmina of male covering about three-fourths of the abdomen, last two joints of maxillary palpi in female dark brown . . . . . 5. *N. palustris*.
  - ee. Medium-sized species ; tegmina of males reaching tip of abdomen, last two joints of maxillary palpi in female light brown . . . . . 6. *N. angusticollis*, n. sp.

3. *NEMOBIUS GRISEUS*, new species.

Size rather small, body moderately slender, light yellowish gray, covered with fine short closely-appressed gray hairs. Head about as wide as the pronotum, rather large, full and rounded; below the antennæ deep shining piceous, elsewhere yellowish gray, the occiput with three distinct dark gray longitudinal bands. Eyes of average size, about as prominent as in *N. fasciatus*, but rounder than in that species. Maxillary palpi dark reddish-brown, the third joint and the apex and base, respectively, of the second and fourth lighter. A dark piceous band starts behind the eye and covers the lateral lobe of the pronotum, except the extreme lower margin, which is light yellowish. Pronotum nearly three-fourths as long as broad, widening slightly posteriorly, dorsum pale yellowish-gray, sparsely covered with black bristles. Tegmina of ♂ usually covering about three-fourths of the abdomen, and fitting closely to the latter, pale yellowish, with the upper half or more of the lateral field shining black, a black streak along the dorsal field near the inner margin, and usually two or three smaller black patches near the base. Tegmina of ♀ usually covering about one-half the abdomen, the hind margin less convex than in *fasciatus*, pale testaceous, a shining black stripe along the upper third of the lateral field, a black streak on the dorsal field between its outer and middle thirds, and a few short streaks and spots on the inner two-thirds. Wings absent or fully developed, and extending beyond the tips of the hind femora by more than one-half their length. Abdomen in ♂ glossy black

on dorsal and lateral surfaces, grayish-yellow beneath; in ♀ with the dorsal surfaces of the first three segments shining black, elsewhere yellowish-gray, with a row of dark spots along the dorsum. Hind femora dark sooty brown above, with a few small light spots along dorsal surface, the dark colour extending down irregularly over about half or more of the inner and outer surfaces, where it is more or less broken into blotches; elsewhere pale testaceous, lighter internally. Legs dark sooty brown, variegated with pale testaceous. Ovipositor about as long as the body, and about one-fourth longer than the hind femora, nearly straight, stout, the apical blades tapering evenly to a fine point, the teeth sharp, prominent, and nearly equidistant.

Length of body, ♂ 7 mm., ♀ 8 mm.; pronotum, ♂ 1.5 mm., ♀ 1.75 mm.; tegmen, ♂ 3.5 mm., ♀ 2.9 mm.; hind femur, ♂ 5 mm., ♀ 6 mm.; ovipositor; 7.7 mm.

12 ♂♂, 13 ♀♀. Toronto, Aug. 16, Sept. 8, 1902; <sup>♂</sup> .nia, Aug. 16, 1901; De Grassi Pt., Lake Simcoe, Aug. 3, 1903; Sept. 1, 1901. I have a single long-winged female, taken at High Park, Toronto, Aug. 16, 1902.

This is a well-marked species, easily distinguished from *N. fasciatus* by its much smaller size, grayish coloration, more distinct dark markings and longer ovipositor. It has the longest ovipositor of any of our species.

It occurs only on sandy soil, where the vegetation is somewhat scanty. I have never taken it in large numbers, but in High Park, where all my Toronto specimens were taken, it is by no means scarce when looked for in the proper kind of locality. Its pale colours renders it very inconspicuous against the sand.

The chirp of the male is a feeble, continuous trill, more high-pitched than that of *fasciatus* or *angusticollis*, and much shorter than either.

#### 4. NEMOBIUS FASCIATUS, De Geer. The Striped Ground Cricket.

*Gryllus fasciatus*, De G., Mem. pour serv. à l'hist. des ins., III., 1773, 55<sup>2</sup>.

*Nemobius fasciatus*, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 430.

*Acheta vittata*, Harr., Ins. Inj. Veg., 1862, 152.

*Nemobius vittatus*, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 430.

*Nemobius fasciatus vittatus*, Beut., Bull. Amer. Mus. Nat. Hist., VI., 1894, 267.

*Nemobius exiguum*, Scudd., Mat. Mon. N. A. Orth., VII., 1862, 429.

Length of body, ♂ 9 mm., ♀ 10 mm.; pronotum, ♂ 1.5 mm., ♀ 2 mm.; tegmen, ♂ 5.5 mm., ♀, 4 mm.; hind femur, ♂ 6.3 mm., ♀ 7 mm.; ovipositor, 9 mm.

I have found this cricket in abundance in all parts of Ontario where I have made collections of Orthoptera. In this species the tegmina usually cover about three-quarters of the abdomen in the ♂, and about half the abdomen in the ♀, and in such specimens the wings are absent. This is the form that was formerly known as *vittatus*. Specimens with wings extending far beyond the end of the abdomen are often met with, however, and are most often seen at night, when they are attracted to light. These long-winged individuals are usually, but not always, females. Blatchley says of this species in Indiana: "During hundreds of days spent in field collecting, not a single specimen of the long-winged form was taken until Aug. 1, 1902, when it was found in numbers on the stems of long grass in a marsh bordering Round Lake, Whitley County." This has not been my experience, as I have frequently come across it in the field. On Aug. 26, 1901, I found large numbers of this form floating on Lake Huron, about a quarter of a mile from the south shore of the Bruce Peninsula. It was a hot, still day, and many other insects were seen floating in the same manner, notably two other Gryllidae, the tree cricket, *Oecanthus fasciatus*, and the long-winged form of *Gryllus abbreviatus*. This species reaches maturity towards the latter part of July, and continues until severe frost, usually in the early part of November.

Specimens from the south-west appear to average larger than those from the north. My largest ones are from Arner, Essex Co., close to the shore of Lake Erie.

Localities : Niagara Falls, Point Pelee, Arner, Chatham, Sarnia, Goderich, Southampton, Bruce Peninsula, Owen Sound, Hamilton, Toronto, Lake Simcoe, Severn River, Lake Muskoka, Algonquin Park, North Bay, Stony Lake (Peterboro' Co.).

Mr. Blatchley has called my attention to a small dark *Nemobius* which he has taken in Northern Indiana, Michigan, and in Ontario across from Buffalo, N. Y. I have also taken this form, and I agree with Mr. Blatchley in considering it to be a small degenerate form of *fasciatus*.

##### 5. *NEMOBIUS CANUS*, Scudd.

*N. canus*, Scudd., Journ. N. Y. Ent. Soc., IV., 1896, 100, 103.

I have a single ♀ *Nemobius* taken at Arner, Ont., which agrees pretty well with Blatchley's description of *canus*. The head is light

reddish-brown, without any trace of the fuscous stripes which are so constant a feature in *fasciatus*. The general coloration is light reddish-brown, with the dark markings more distinct than in *fasciatus*. The eyes are more globose than is usual in that species. It may be only an atypical specimen of *fasciatus*, but it appears to show the chief peculiarities by which *canus* is known from the latter.

6. *NEMOBIUS MACULATUS*, Blatchley.

*N. maculatus*, Bl., Psyche, IX., 1900, 52.

On Aug. 22, 1903, when collecting near Tobermory, on the Bruce Peninsula, I found a small *Nemobius* in considerable numbers jumping about in a small patch of moss in the spruce woods. I captured 4 ♂♂ and 3 ♀♀, and on my return to Toronto sent a pair to Mr. Scudder, who named them *N. maculatus*. They do not agree with Blatchley's description in all respects, and I do not feel satisfied that they really belong to that species. The ovipositor in *maculatus* is equal to or very slightly shorter than the hind femora, whereas in my specimens it is slightly longer in one and distinctly longer in the other two. The tegmina are shorter than the average in *N. fasciatus*, but are longer than those of typical *maculatus*, according to the description. They agree with the latter in having fine cross veinlets in the ♂ tegmina. The coloration does not show the spotty pattern of *maculatus* in any marked degree.

Length of body, ♂ 8 mm., ♀ 8 mm.; pronotum, ♂ 1.5 mm., ♀ 1.6 mm; tegmen, ♂ 3.5 mm., ♀ 2.75 mm.; hind femur, ♂ 5 mm., ♀ 5.3 mm.; ovipositor, 6.5 mm.

7. *NEMOBIUS PALUSTRIS*, Blatchley. The Marsh Ground Cricket.

*N. palustris*, Bl., Psyche, IX., 1900, 53.

Length of body, ♂ 5.5 mm., ♀ 6 mm.; pronotum, ♂ 2 1 mm.; tegmen, ♂ 2.7 mm., ♀ 2 mm.; hind femur, ♂ 3.5 mm., ♀ 4 mm.; ovipositor, 3 mm.

On the 18th of August, 1903, I came across this handsome little cricket in a sphagnum swamp on the margin of Ragged Lake, Algonquin Park. The swamp bordered the lake for a few hundred yards about the mouth of a small creek, and was of a very interesting character. It was carpeted throughout with a deep growth of sphagnum moss, in which cranberries (*Oxycoccus macrocarpus*) were growing in the greatest profusion. Pitcher-plants (*Sarracenia purpurea*), various Ericaceæ, such as *Andromeda polifolia* and *Chamaedaphne calyculata*, were also conspicuous among the plants, the only trees being a few dwarf specimens of black

spruce and tamarack. For about a hundred yards beyond the margin of the creek the swamp was a true floating bog, and the trees very few and small; and it was here that the crickets were found. They were present in considerable numbers, but were very difficult to capture, and when alarmed would at once burrow down among the masses of sphagnum. By pressing these masses down under water, it was often possible to bring the crickets to the surface.

Mr. Blatchley, to whom I sent a pair, remarks that the specimens are smaller than typical ones from Indiana. They are much the smallest of the Ontario *Nemobius*.

My attention was first called to this species by its chirp, which is a continuous and rather feeble trill, very like that of *N. angusticollis*.

8. *NEMOBIUS ANGUSTICOLLIS*. New species.

*N. palustris*, Walk., Ann. Rep. Ent. Soc. Ont., 1901, 109.

Size medium, body of male very broad. Head small but prominent, dark shining brown, more or less obscurely trifasciate above with darker brown, rather scantily covered with black bristles. Eyes small but prominent, oval. Maxillary palpi light brown, the terminal joint infuscated apically. Pronotum nearly smooth, somewhat shining dark piceous, more or less faintly variegated with lighter brown, sparsely covered with black bristles; slightly narrower at the anterior margin than the head, about equal to it in width at the hind margin; a rather deeply impressed median longitudinal line on the anterior half. Tegmina of ♂ reaching tip of abdomen, very broad, the dorsal breadth being much greater than that of the pronotum, but fitting pretty closely to the abdomen; uniform deep shining piceous. Tegmina of ♀ covering about two-thirds of the abdomen. Wings absent or fully developed, and extending beyond the tips of the cerci. Legs and abdomen fuscous, the former more or less variegated with pale testaceous, the hind femora without bands upon the inner surface. Ovipositor a little more than one-half as long as the hind femora, slightly arcuate, and feebly expanded at the base of the apical fourth, each blade bearing an irregular row of rather sharp teeth, the basal ones fine and close together, the apical coarse and unusually far apart.

Length of body, ♂ 8 mm., ♀ 8.5 mm.; pronotum, ♂ 1.5 mm., ♀ 1.6 mm., tegmen, ♂ 5.4 mm., ♀ 3.4 mm.; hind femur, ♂ 4.5 mm., ♀ 5 mm.; ovipositor, 3.3 mm.

This species is most related to *N. confusus* and *N. palustris*, and also resembles *N. exiguis* in some respects. It differs from all three in

the smaller head and narrower pronotum, the width of which, in *angusticollis*, is less than the dorsal field of the tegmina in their natural position. It differs from *palustris* in the much greater size, the longer and broader tegmina in the male, lighter maxillary palpi and shorter ovipositor, with more irregular teeth. From *confusus* the male of *angusticollis* differs in the longer and broader tegmina, those of *confusus* covering only three-fourths of the abdomen, and in the uniform coloration of the hind femora, those of *confusus* being blotched and spotted on the inner surface. The females of *angusticollis* approach those of *confusus* so closely that they are separated with difficulty. The last two joints of the maxillary palpi in the latter are white, those of the former light brown; the hind femora and ovipositor are somewhat shorter in *confusus*, while the pronotum as mentioned before is broader than in *angusticollis*. From *exiguus*, *angusticollis* differs in the much darker and more uniform coloration, the much broader body and tegmina in the male, narrower hind femora, and in the somewhat longer and more sharply-toothed ovipositor.

Although neither has been reported from Ontario, I have figured both *exiguus* and *confusus* from specimens kindly loaned me by Mr. Blatchley, because it is thought that this will aid in the separation of these difficult species, and it is quite possible that both, especially *exiguus*, will eventually be found to occur in Ontario. *Angusticollis* is, next to *fasciatus*, the commonest *Nemobius* in Ontario. It frequents low grounds of almost any kind, but delights especially in low grassy borders of swampy woods or clearings in swamps. I have found it in abundance in sphagnum moss when growing in such localities, but have not met with it in the open peat-bogs where *N. palustris* occurs. It is also found beneath stones along the margins of lakes and streams.

I first discovered this insect through its stridulation; which I heard among the granite boulders which line the shores of Lake Simcoe at De Grassi Pt. It was a high-pitched continuous trill of considerable volume, and although I could approach the performer within a few feet, it was always necessary to disturb the rock in order to expose him. This, of course, not only silenced him, but allowed him to make himself scarce, and it was not until after repeated efforts that I at last secured one of the little musicians.

Of the long-winged form I have but a single pair, a male taken at De Grassi Pt., July 30, 1901, and a female from the Severn River, Aug. 24, 1898.

This species reaches maturity about the last week of July, and continues till November.

Localities: Toronto, Sept.-Nov.; Lake Simcoe, July 29-Sept. 14; Sarnia, Aug. 15, 1901; Southampton, Aug. 20, 1901; Owen Sound, Aug. 31, 1901; Severn River, Aug. 24, 1898.

(To be continued.)

#### EXPLANATION OF PLATE 4.

1. *Nemobius griseus*, nov. sp., ♂.
2. " " " " ♀.
3. " *fasciatus vittatus* (De G.), Harr., ♀.
4. " *maculatus* (?), Blatch., ♀.
5. " *exiguus*, Blatch., ♂.
6. " " " " ♀.
7. " *confusus*, Blatch., ♂.
8. " " " " ♀.
9. " *angusticollis*, nov. sp., ♂.
10. " " " " ♀.
11. " *palustris*, Blatch., ♂.
12. " " " " ♀.

All the figures are magnified two and one half diameters.

#### THE REVEREND P. JEROME SCHMITT.

We regret to chronicle the death of the Rev. P. Jerome Schmitt at St. Vincent's College, near Beatty, Pa., on April 27th. Father Schmitt was well known to the entomological world as a most careful and able worker, generous with his specimens and his time. He will be sadly missed by those who had the privilege of his acquaintance.

Father Schmitt was born at Neuhausen, Wurtemberg, May 30, 1857; he came to St. Vincent's College in 1869, and in 1876 joined the Benedictine Order. In 1881 he was ordained priest of the Roman Catholic Church, and spent the greater part of the remaining years of his life in teaching the classics at the College. He found time for a great deal of close work with the Coleoptera, and was especially devoted to the study of some of the minute Clavicornia, as will be seen by reference to the writings of present-day authors. At the time of his seizure by the disease which resulted in his death, he was engaged on a descriptive catalogue of the Pselaphidae collected in Brazil by H. H. Smith.

His collections and manuscripts remain at the College where his life was spent, and the material collected by him will no doubt be carefully preserved by his confreres. It has formed the basis of numerous records in Dr. Hamilton's Catalogue of the Coleoptera of Western Pennsylvania, and has furnished types of many new species described during the past ten years.—H. F. W.

## SYNOPSIS OF BEES OF OREGON, WASHINGTON, BRITISH COLUMBIA AND VANCOUVER.—III.

BY H. L. VIERECK, ASSISTED BY T. D. A. COCKERELL, E. S. G. TITUS,  
J. C. CRAWFORD, JR., AND M. H. SWENK.

## ANDRENA, Fabr., and OPANDRENA, Robt.

## Females.

- Third joint of antennæ equal to 4 + 5, or very nearly ..... 1.
- Third joint of antennæ longer than 4 + 5 ..... 4.
  - 1. Scopa ample, compact, the hairs long and curved up ..... 2.
  - Scopa with the hairs short and straight ..... 3.
  - 2. Abdomen punctured; dorsum closely indistinctly punctured, not metallic; enclosure very finely rugulose, almost smooth ..... *viburnella*.
- Abdomen not punctured.
  - Without distinct narrow fasciæ.
    - Fovea about as broad as one-half the distance between lateral ocellus and eye margin.
    - Enclosure granular, very nearly rugulose; abdomen black ..... *melanochroa*.
    - Enclosure very finely granulated, abdomen greenish ..... *chlorogaster*.
  - With distinct narrow fasciæ.
    - Dorsum impunctate or with indistinct punctures; abdomen black; dorsum dull.
      - Second abdominal segment with a broad whitish testaceous margin at apex ..... *Illinoiensis*.
      - Abdominal segments not broadly testaceous; green or greenish or blue.
        - Enclosure nearly smooth; abdomen greenish ..... *Piperi*.
        - Enclosure rugulose; abdomen distinctly green ..... *chlorinella*.
        - Abdomen distinctly blue ..... *candida*.
      - 3. Metatarsus of posterior legs one-half as wide as the tibiae at apex; enclosure smooth; abdomen indistinctly fasciate ..... *angustitarsata*.
      - Metatarsus of posterior legs more than one-half as wide as the tibiae at apex.
        - Abdomen fasciate; clypeus indistinctly punctured, dull.
          - Enclosure smooth; pubescence abundant on the clypeus; pubescence of dorsum gray ..... *mustelicolor*.
          - Enclosure smooth; pubescence sparse on the clypeus ..... *subtilis*

4. Abdominal segments depressed nearly to the base . . . . *trachandrenoides*.  
     Abdominal segments not unusually depressed.  
         Abdomen distinctly punctured ..... 5.  
         Abdomen not distinctly punctured ..... 8.
5. Enclosure coarsely rugose, at least at base; dorsulum with very distinct punctures; superior surface of metathorax rather convex .. 6.  
     Enclosure not coarsely rugose; nearly smooth ..... 7.
6. Abdomen shining; hair of dorsulum and face white or pale ochreous.  
     Abdomen black.  
         Pubescence white ..... *Kincaidii*.  
         Pubescence yellow ..... *Kincaidii* var.  
         Abdomen red, at least partly ..... *Kincaidii*, var. *Pascensis*.  
         Abdomen dull; hair of dorsulum and face bright fulvous ..... *Vernoni*.
7. Punctures of abdomen sharply defined; posterior tibiae dark; enclosure rather rugose ..... *Cressoni*.
8. Abdomen fasciate, with rather dense appressed hair bands ..... 24.  
     Abdomen usually without dense appressed hair bands, where they occur they are not broad, and the abdomen is tessellate  
         punctate ..... 9.
9. Abdomen with more or less abundant erect pale hair ..... 20.  
     Abdomen with no conspicuous erect pale hair ..... 10.
10. Abdomen and scopa with pale pubescence ..... 11.  
     Abdomen and scopa with black or very dark pubescence ..... 17.  
     Abdomen with black pubescence; scopa with pale pubescence ..... 16.
11. Abdomen very distinctly punctate tessellate ..... 12.  
     Abdomen not distinctly punctate tessellate ..... 13.
12. Clypeus finely punctured, almost granular ..... *pulverulenta*.
13. Length over 11 mm ..... 14.  
     Length less than 11 mm ..... 15.
14. Dorsulum impunctate ..... *seminigra*.
15. Abdomen with lateral patches of silvery appressed pubescence ..... *subaustralis*.
16. Pubescence of dorsulum black ..... *indotata*.
17. Enclosure smoother, only partly rugose.  
     Abdomen tessellate punctate ..... 18.  
     Abdomen not punctured ..... 19.

## 18. Punctures of abdomen dense.

- Face with black hairs; first recurrent nervure received before the middle of the second submarginal cell; dorsulum with reddish pubescence ..... *Halli*.  
 Face with ochreous hairs; first recurrent nervure received beyond the middle of the second submarginal cell; pleura with pale pubescence ..... *solidula*.  
 Face with ochreous hairs; first recurrent nervure received before the middle of the second submarginal cell; pleura with pale pubescence ..... *junonia*.  
 Face with pale to dark brown hairs; pleura with pale pubescence ..... *compactiscopa*.

## Punctures of abdomen not dense.

- Pubescence of dorsulum ochreous.  
 Pleura pale ..... *vicina*.  
 Pleura black.  
 Abdomen black.  
 Dorsulum entirely pale.  
 Face with pale pubescence; first recurrent nervure received before the middle of the second submarginal cell ..... *Carlini*.  
 Face with black pubescence; first recurrent nervure received beyond the middle of the second submarginal cell ..... *neurona*.  
 Enclosure smooth ..... *neurona*.  
 Enclosure partly rugose ..... *pluvialis*.  
 Dorsulum with a black band ..... *transnigra*.  
 Abdomen blue ..... *Seattlensis*.

## 19. Clypeus sparsely punctured, especially in the middle. \*

- Clypeus deeply punctured.  
 Abdomen blue, with a greenish cast ..... *Chapmanæ*.  
 Abdomen greenish and purplish ..... *Chapmanæ* race.  
 Abdomen black.  
 Scopa very compact ..... *Pullmani*.  
 Scopa loose ..... *longihirtiscopa*.  
 Clypeus not deeply punctured ..... *vicinoides*.

20. Scopal hairs long and curved ..... 21.  
 Scopal hairs short and straight ..... 22.  
   Abdomen covered with pale hairs except at apex ..... 23.  
   Abdomen only partly covered with pale hairs.  
     First abdominal segment with pale hairs.  
       Posterior legs black or nearly ..... *saccata*.  
       First and second abdominal segments with some pale hairs;  
       scopa pale.  
       Clypeus rather sparsely punctured, especially in the  
         middle ..... *hemileuca*.  
       Clypeus rather densely punctured ..... *clypeoparia*.  
 22. Scopa thinly pubescent ..... *advarians*.  
   Scopa densely pubescent ..... *Washingtoni*.  
 23. Clypeal punctures fine and dense.  
   Nearly all scopal hairs white.  
     Pubescence on abdomen abundant; anal fimbria white, tinted  
       with brown ..... *moesta*.  
     Only the lower half of the scopa with pale or  
       white hairs ..... *albihirta* = *perarmata*.  
   Clypeal punctures large and sparse.  
     Dorsulum with sparse pubescence; first two segments of abdomen  
       no more pubescent than the remaining segments ..... *Harveyi*.  
     Dorsulum with abundant pubescence; first two segments of  
       abdomen distinctly more pubescent than the remaining  
       segments ..... *asmi*.  
 24. Fovea about one-half as wide as the distance between the eye and  
       lateral ocellus ..... 26.  
 Fovea distinctly broader than one-half the distance between the eye  
       and lateral ocellus.  
     Process of labrum ordinary, truncate or rounded ..... 25.  
     Process of labrum various, as long as broad at base, quadrate,  
       finger-shaped, emarginate or pointed ..... 27.  
 25. Clypeus with a distinct median impunctate space or the punctures  
       sparse.  
     A clearly defined median impunctate space on the  
       clypeus ..... *medionitens*.  
     No clearly defined median impunctate space on the  
       clypeus ..... *semipolita*.

Clypeus closely punctured.

Dorsulum with pale pubescence.

Abdomen greenish, purplish or bluish.

First recurrent nervure received by the second submarginal cell before the middle ; anal fimbria bright brown . . . . . *xanthostigma*.

First recurrent nervure received by the second submarginal cell beyond the middle ; anal fimbria sooty.

Abdomen dull ; stigma pale . . . . . *candida*.

Abdomen rather shining ; stigma dark . . . . . *subcandida*.

Abdomen black.

First recurrent nervure received by the second submarginal cell before the middle ; abdomen thinly subfasciate . . . . . *decussata*.

First recurrent nervure received by the second submarginal cell beyond the middle ; abdomen not fasciate . *decussatula*.

Abdomen fasciate ; dorsulum dull, apparently impunctate ; clypeus not hidden by pubescence ; abdomen greenish . . . . . *subdistans*.

26. Enclosure not rugose.

Clypeus dull impunctate . . . . . *plana*.

Clypeus dullish, dense, with indistinct punctures . . . . . *auricoma*.

Clypeus rather closely punctured, but not densely . . . . . *scurra*.

27. Process of labrum finger-shaped ; scopula compact . . . . . *Macquillivrayi*.  
Process emarginate, but not deeply.

Posterior legs pale . . . . . *nubilipennis*.

Posterior legs dark ; abdomen fasciate ; anal fimbria dark brown . . . . . *W-scripta*.

ANDRENA.

Males.

Cheeks produced into a rounded angle . . . . . 1.

Cheeks regularly rounded, not angulate . . . . . 10.

1. The angle opposite or below the middle of the eye . . . . . 2.

The angle above the middle of the eye . . . . . 7.

2. Angle opposite the middle of the eye . . . . . 3.

Angle below the middle of the eye . . . . . 6.

3. Joint 3 shorter than 4 . . . . . *hemileuca*.

Joint 3 longer than 4, but shorter than 4 + 5 . . . . . 4-

Joint 3 about equal to 4 + 5 . . . . . 5.

4. Abdomen with black pubescence. .... *solidula*.  
 Abdomen with pale pubescence.  
   Fasciae absent..... *deccussata*.  
 5. Pubescence on face and thorax partly black..... *Harveyi*.  
 6. Pubescence white..... *viburnella*.  
   Pubescence ochreous..... *viburnella* var.  
 7. Mandibles armed with a tooth at base..... 8.  
   Mandibles not armed with a tooth at base..... 9.  
 8. Pubescence of abdomen pale and black ; joint 3 much longer than 4,  
   but not as long as 4 + 5 ..... *advarians*.  
   Pubescence of abdomen pale.  
   Pubescence fulvous ; joint 3 = 4 or nearly ..... *asmii*.  
   Pubescence white ; joint 3 much longer than 4, but not as long  
   as 4 + 5 ..... *perarmata*.  
 9. Abdomen black.  
   Pubescence white ..... *subaustralis*.  
   Pubescence ochreous to fulvous ..... *subaustralis* var.  
 10. Joint 3 about = to 4..... 11.  
   Joint 3 distinctly longer than 4, but shorter than 4 + 5 ..... 13.  
 11. First recurrent nervure received by the second submarginal cell before  
   the middle ..... 12.  
   First recurrent nervure received by the second submarginal cell beyond  
   the middle ; abdomen blue ..... *candida*.  
 12. Dorsulum punctured (species not determined) .....  
   Dorsulum impunctate ..... *angustifovea*.  
 13. First recurrent nervure received by the second submarginal cell  
   before the middle ..... 14.  
   First recurrent nervure received by the second submarginal cell  
   in or beyond the middle ..... 17.  
 14. Abdomen punctured ..... 15.  
   Abdomen impunctured ..... 16.  
 15. Metathorax smooth ..... *W-scripta*.  
 16. Enclosure granular.  
   Pubescence dense ; antennæ pale in front ..... *Illinoiensis*.  
   Pubescence thin ; antennæ black in front ..... *melanochroa*.  
   Enclosure indistinctly striated.  
     Stigma dark brown ; pubescence of dorsulum fulvous .. *medionitens*.  
     Stigma pale ; pubescence of dorsulum pale ochreous .. *microsoma*.

17. Abdomen fasciate or subfasciate ..... 18.  
     Abdomen not at all fasciate ..... 24.
18. Abdomen densely clothed with ochreous  
     pubescence ..... *trachandrenoides*.  
     Abdomen not densely clothed with ochreous pubescence ..... 19.
19. Legs pale, wings yellow ..... *auricoma*.  
     Legs dark, wings not yellow, pale ..... 20.
20. Dorsulum shining ..... *scurra*.  
     Dorsulum dull ..... 21.
21. Abdomen blue ..... *Seattlensis*.  
     Abdomen black ..... 22.
22. Pubescence bright fulvous ..... *Washingtoni*.
23. Large 10 mm.; fasciae rather distinct ..... *Macquillivrayi*.  
     Smaller 8 mm.; fasciae rather indistinct ..... *Pullmani*.
24. Abdomen with some black pubescence ..... 25.  
     Abdomen with no black pubescence ..... 26.
25. Face and legs with black hair ..... *Carlini*.  
     Face and legs with pale hair ..... *saccata*.
26. Cheeks not twice as broad as the eye ..... *vicina*.  
     Cheeks twice as broad as the eye ..... *pulverulenta*.

## OPANDRENA and PTERANDRENA.

## Males.

- Joint 3 longer than 4, shorter than 4+5.
- Abdomen more or less distinctly punctured ..... 1.  
     Abdomen impunctate ..... 4.
1. Tibiae pale ..... 2.  
     Tibiae dark ..... 3.
2. Abdomen shining; indistinctly fasciate; pubescence whitish .. *Kincaidii*.  
     pubescence fulvous .. *Kincaidii* var.  
         Abdomen dull, distinctly fasciate ..... *Vernoni*.
3. Abdomen rather indistinctly punctured; scutellum polished .. *Trevoris*.  
     Abdomen distinctly punctured; scutellum dull ..... *Cressoni*.
4. Dull; distinctly fasciate ..... *mustelicolor*.
- Joint 3 longer than 4+5; abdomen shining subfasciate .... *pallidifovea*.  
*Andrena viburnella*, Graen. CAN. ENT., XXXV., 1903, p. 165.  
     ♀, 6th, 7th June, 1899, Corvallis, Or. (Cordley); ♂, 27th April,  
     1895, Almota, Wash. (C. V. Piper); 17th April, 1896, Livingston, Vanc.;  
     Victoria, B. C. This may be the same as *A. perplexa*, Sm.

*Andrena melanochroa*, Ckll. Ent., Lond., 1898, p. 89.

♀, 25th May, 1894, Olympia, Wash.; ♂, 15th May, 1894, Olympia, Wash. (T. Kincaid); ♀, 18th May, 1896, Livingston, Vanc. (2119).

*Andrena chlorogaster*, n. sp.

♀ 6 mm. A small, almost entirely impunctate species, with pale hairs in the fovea, pale pubescence and dark brown stigma.

Type locality: Oregon. Type Am. Ent. Soc., Phila.

*Andrena Illinoiensis*, Robt. Trans. Am. Ent. Soc., Phila., XVIII., p. 54.

♀, 16th April, 1897; ♂, April, 1895, Pullman, Wash. (C. V. Piper).

*Andrena Piperi*, n. sp.

♀ 7 mm. Dull black, finely sculptured, impunctate, covered with white pubescence, stigma pale brown.

Type locality: Pullman, Washington. Type Univ. of Nebraska.

*Andrena chlorinella*, n. sp.

♀ 8 mm. Pubescence white; fovea nearly black; dorsum purplish and greenish; abdomen blue and greenish; anal fimbria nearly black.

Type locality: Corvallis, Oregon. Type Acad. Nat. Sci., Phila.

20th May, 1899, at the type locality (Cordley).

*Andrena candida*, Sm. New Spec. Hym. Brit. Mus., p. 55.

♀, 18th June, 1895, Olympia, Wash. (T. Kincaid); ♂, 18th June, 1895, Olympia, Wash. (T. Kincaid); April, Pullman, Wash. (R. W. Doane), Vancouver (Sm.).

*Andrena angustitarsata*, n. sp.

♀ 9 mm. Pubescence ochreous; fovea ochreous. This is a stylopized specimen, and may be an aborted *A. subtilis*, the abortion due to the presence of the stylops.

Type locality: Washington. Type Am. Ent. Soc., Phila.

*Andrena mustelicolor*, n. sp.

♀ 9 mm. Pubescence mouse gray; anal fimbria and fovea brownish.

Type locality: Pullman, Washington. Type Univ. Nebraska.

♀, Pullman, Wash. (C. V. Piper); ♂, 9th May, 1899, Corvallis, Or. (Cordley).

*Andrena subtilis*, Sm. New Spec. Hym. Brit. Mus., p. 55.

♀, July, 1898; 4th May, 1898; 7th May, 1899; 8th June, Corvallis, Or. (Cordley); ♂, Pullman, Wash. (C. V. Piper); Vancouver (Sm.).

(To be continued.)

## NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, S. B., M. D., DECATUR, ILL.

(Continued from page 173.)

*Mamestra elsinora*, n. sp.—*Expanse* : 37 mm.

General colour very dark blackish brown, with a slight purplish tinge, quite smooth and somewhat shiny. Ordinary markings jet black, but not conspicuous, owing to the similarity in shade with the ground colour. The distinct black, more or less solidly filled claviform and the yellow-filled reniform are the most conspicuous features in the maculation. Basal line present though fragmentary, represented by two blackish dots on costa, in one specimen with some whitish scales between them, forming a more or less evident dot, in the other specimen this is not so noticeable, the line is also evident between the median and submedian veins, though in a lighter, diffused sort of way. Just above the median vein is a small yellow point, quite distinct in one specimen, faint in the other. T. a. line transverse, more or less outwardly scalloped between veins, in a few places, especially on the costa, showing as a double line, with a somewhat paler filling. The outer line is the more easily traced, but even this is not very distinct without a lens. A narrow median shade can be made out running from costa downward and outward to lower edge of reniform, thence to inner margin very close to termination of t. a. line. T. p. line only moderately exerted over cell, thence parallel to outer margin in a quite direct line to inner margin, inwardly scalloped between veins. An outer accompanying line is only indicated here and there by a few scales and a tendency to a lighter filling between the two is evident though very faintly marked. S. t. line fragmentary, wavy, showing a mixture of black and yellow scales, with the naked eye the yellow can be traced as a faint fragmentary line across the wing and the black as two closely approximate sagittal dashes opposite cell, extending almost to reniform and usually one smaller one just below costa. With the lens these sagittal marks can be traced more or less plainly across the wing, and the yellow scales seem to be imbedded in them. There are fine yellow points at the termination of veins, which have a tendency to extend outward, more or less completely through fringe, giving it a faintly checkered appearance. Fringe concolorous, with a very faint, wavy, lighter mesial line. Orbicular moderate in size, narrowly black ringed, within which the lens shows indications of a fine yellowish line.

July, 1904.

Reniform moderate in size, erect, surrounded by a black line, which is, however, somewhat broken and of uneven width, outwardly broadly yellow-filled, inwardly to a lesser degree; this yellow colour in one specimen largely fills the spot, in the other it is broken and fragmentary. Claviform conspicuous, black-filled, crosses t. a. line, and in some instances its lower fork almost, if not quite, reaches basal line. Hind wings with a broad blackish fuscous outer border, inwardly much lighter. Discal dot well marked. Mesial band faint, lighter, hard to follow from its being merged in fuscous border. Fringe, outer portion whitish, inner half fuscous, with pale wavy yellowish-white line at base.

Beneath: fore wings dark fuscous, more or less mixed with gray along costa and outer margin. Mesial line evident, though not prominent. Discal dot present. Hind wings dark grayish fuscous along costa and external margins, paler centrally. Well-marked mesial band and discal dot. Head, collar and thorax slightly darker than wings. Abdomen fuscous, paler at base. One or two dorsal tufts at base, though not prominent. Palpi blackish outwardly, lighter inwardly. Tongue yellowish, at root of tongue on either side, when seen with lens, a small tuft of bright orange hair. Thorax, abdomen and legs dark smoky fuscous. Eyes hairy. Antennæ broadly bipectinate, pectinations terminating in one or two fine ciliæ. Antennæ light yellowish fuscous.

Types: 2 ♀'s, Huachuca Mts., Ariz.

*Mamestra hueco*, n. sp.—Expanse: 35 mm.

General colour a light yellowish brown or tan with darker coloured or purplish brown markings, relieved by whitish shades, especially in the median space. Palpi yellowish at tip, reddish outwardly. Head yellowish. Collar tan-coloured, yellowish at base, tipped with whitish. Patagia purplish-tan, somewhat darker than collar, bordered and tipped with whitish. Thorax tan, moderate posterior thoracical tuft. Abdomen tan and purple shades, latter most pronounced at the posterior part and former at the anterior part of the segment, anal tuft distinct and well marked. Abdomen at sides, below the middle, densely coated with tan-coloured hairs, having a tendency to arrange themselves in tufts. Fore wings, basal half line distinct, purplish, in the centre just above median veins a prominent broad, solid tooth of the same colour projects almost to the t. a. line, there is also a small tooth above and below the median one. The lower one of these is almost or quite connected with a

similar inwardly-projecting tooth on the t. a. line by a band of the same colour. The basal line is bordered inwardly by a well-marked reddish band, which extends beyond it to the submedian vein, thence outward as an accompanying shade. T. a. line distinct, purplish-brown, transverse. Two inwardly-projecting teeth just above and below the median vein, forming a well-marked W, as above mentioned they show a tendency to connect with the basal line, the lower part of the line forms a single broad scallop to inner margin, there is an accompanying whitish shade on the outer side, and at inner margin a slight indication of an accompanying purplish line. T. p. line distinct, vinous, somewhat irregular in width, exserted over cell in a somewhat quadrangular manner, thence to inner margin in a couple of broad waves. The line is peculiar in that it does not extend entirely to costa, but turns inward at quite a sharp angle and follows parallel to costa and at about  $\frac{1}{2}$  mm. removed from it, as a narrow purplish line as far as outer edge of orbicular. The line itself, as well as the prolongation, is bordered within with a lighter diffuse whitish shade. At inner margin the line is accompanied on its inner side for a short distance by an accompanying line. The veins through the median space are very delicately and lightly tinted with purplish and also accompanied by whitish shades. The median shade is diffuse, scarcely, if at all, to be traced except from inner margin to lower edge of reniform. S. t. line pale yellowish, scalloped, bordered within and without with purplish, on the outside this purplish border projects along veins as sharp teeth to terminal line. The veins in the subterminal space and especially in the centre of the wing are quite heavily coated with purplish shades, which almost, if not quite, join in many places, connecting the purple shades of the t. a. and s. t. lines. There is a purplish terminal line composed of shallow lunules, these are accompanied inwardly by a pale yellowish shade, which gradually darkens as it approaches the s. t. line. Fringes pale at base, purplish outwardly, cut with paler at termination of veins, in some specimens there is an extremely faint median lighter line. Pale yellowish spots on costa at inceptions of basal and t. a. lines, one over cell and three similar dots on apex. Orbicular quite large, subquadrate, quite evenly tan-coloured, bordered outwardly with pale, within which is purplish ring, varying in width, in general much broader in the superior half. Reniform large, slightly oblique, constricted in centre, purplish and light ring the same as orbicular, centre somewhat paler. In one specimen before me

there is, at the inner upper edge of reniform, a small purplish dot, surrounded by the prolongation of the yellowish border, a corresponding dot of similar size is at the outer upper edge of the orbicular. In other specimens these spots are fused with the purple rings of the ordinary spots, forming slight projections on them, in some specimens they are separate on one side, united on the other. Claviform is present, distinct, though not prominent, lighter tan-coloured outlined in pale yellow. Hind wings pale yellowish, semitranslucent, slightly darker outwardly and along veins.

Beneath: fore wings yellowish, paler than above, longitudinally streaked with purplish in middle of wing, from base to end of cell, some purplish streaks at base. Hind wings pale yellowish-white, slightly purplish along costa and at upper angle. Two or three purplish spots along veins towards costa, the only indication of a mesial band. On primaries the purplish shades terminate rather abruptly and are here somewhat thickened along the veins, giving a rather faint resemblance to mesial band. Discal spots only apparent as a few faint dark scales, under lens, not apparent to the naked eye. Abdomen below rusty tan colour, more or less mixed with purplish. Legs banded yellowish and purple.

Types: ♂ and ♀, Huachuca Mts., Ariz.

*Admetovis similaris*, n. sp.—We have received at various times a number of specimens of an insect showing on superficial examination so much similarity to *oxymorus*, Grt., that we have without further investigation placed them together. We find both forms likewise in the National Museum and Henry Edwards's collections, and, if we remember correctly, also in that of Mr. Neumoegen. Both forms seem to occur in the same locality, as we have examples of each from Arizona and S. California. *Oxymorus* we also have from Colorado. Grote's figure (Bull. Buff. Soc., Vol. I., p. 133, Pl. iv., fig. 5) leaves no doubt as to which form he had before him when he made his description, and for the other, of which we now have six specimens before us, evenly divided as to sex, we propose the name *similaris*. The most obvious distinguishing feature lies in the secondaries, which in the new variety are semi-translucent, white with a faint yellowish tinge, and show none of the yellowish brown scales which almost, or quite, cover the wing in *oxymorus*. A few faint dots in two of the females suggest a mesial line, and a very faint discoloration in one female towards anal angle and

a slight darkening of some of the veins, especially in the female, are all that mars the otherwise uniform clearness of the wings. In *oxymorus* the darker portions of the fore wings are frosted with white, more or less obscuring the markings and giving a powdery appearance to the wings. In *similaris* these portions are smooth, even, dark iron-gray, neater and cleaner looking, not so "mussed up." The basal and t. a. lines are fine, black and more distinct than in the older species. No trace of claviform, except in one specimen, and that very faint, while in *oxymorus* it is quite marked. The t. p. line is exserted further beyond cell and on inner margin comes closer to the t. a. line. The upper of the two dark patches beyond s. t. line is more triangular, and the lower extends farther in towards t. p. line.

Types: 3 ♂'s, 3 ♀'s. So. California, March and May; Arizona, April and May.

*Taniocampa alamosa*, n. sp.—Expanse: 34 mm.

Ground colour yellowish-brown or sepia, markings darker shades of the same colour, with a vinous or purplish cast. Ordinary lines double distinct, pale-filled, basal half line well marked crenulated, outer portion emphasized just above median vein by a small, rather broad toothed projection, surrounded by the same shade as the filling. T. a. line transverse, irregular, cut by the somewhat lighter veins, outer portion heavier than inner. Median shade well marked, passes almost directly across wing from inner margin to costa, between reniform and orbicular, it is also cut by the lighter veins and slightly lunulated between them, especially in lower half. T. p. line well-defined, moderately exserted over cell and slightly incurved below it, consists of a series of lunules between veins, the lunular character being more marked opposite cell. S. t. line distinct, pale yellowish-tan, wavy, emphasized by a preceding rather purple shade, which is made up of lunules between the veins, the line being almost or quite cut by them. The terminal space has a row of terminal lunules projecting between them, both being of a purplish colour. These purplish lunules are continued through the fringe, which otherwise is of a lighter colour. Orbicular moderate in size, subquadrate, slightly inwardly oblique, pale-ringed, purplish-filled, somewhat lighter centrally. Reniform of good size, erect, moderately constricted, pale-ringed, purplish-filled, somewhat lighter centrally. Hind wings yellowish-white, slightly darker along extreme edge. Veins somewhat darker, fringe concolorous.

Beneath: fore wings pale yellowish, somewhat darker centrally, quite uniform double outer line well-marked on costa towards apex, fading out below. Veins, especially towards apex and outer margin, somewhat covered with purplish scales. Some ochre-coloured hairs at base of wing and inner margin. The central portion of wing is also thinly-covered with moderately long white hairs. Hind wings pale yellowish, costal edge and veins somewhat darkened. Palpi yellowish inside, mixed with purple outside. Head, collar and thorax mottled tan and purplish, arranged on collar in alternate bands. The scales at front of thorax, just behind collar, are of a more ochraceous tint. Abdomen pale yellowish, slightly darker than secondaries. Beneath: legs yellowish internally, purplish and tan externally.

Type: ♂ and ♀, Huachuca Mts., Ariz.

*Tricholita chipeta*, n. sp.—♂ 32 mm., ♀ 35 mm.

In many collections will be found specimens of a species of *Tricholita* from Colorado, under the name of *fistula*, Harv., most of these came from either Mr. Bruce or myself. At the time these were distributed I had no specimens of Harvey's species from California, from which locality the types originally came, and so had no reason to doubt the correctness of the identification. Having recently, however, received specimens from California which agree much more nearly with Harvey's description, I feel certain they are the true *fistula*, and that we have in the Colorado specimens a distinct species. There is no question but that the two species I have before me are perfectly distinct. In a series of eight specimens from Colorado, evenly divided as to sex, the following variations from the Californian ones are constant: The arrangement of the white spots in the form of a pipe (mentioned by Harvey) is very clear in the Californian specimens, in the Colorado ones the upright row of spots is more rigid, not so curved, and the inner spot corresponding to the bowl of the pipe is in all the specimens prolonged inwardly as a sharp spur varying in length, in some specimens reaching as far as the inner edge of the orbicular, it is bordered above and below by a more or less distinct black line. The claviform is plainly marked, neatly outlined in black in all Colorado specimens, while no trace of it can be seen in the others. The orbicular is drawn out in a longitudinal direction, and in some specimens is continued quite a distance inwards towards the base, in other specimens there is a single black line running inwards from orbicular. In

some specimens the cell is considerably darkened, in others very slightly so. The secondaries are whitish, dusky along margins in male, in the female dusky throughout, though somewhat lighter at base. Fringe dusky at base, white externally. Beneath *fistula* is much darker and has a well-marked mesial line on both wings, of which there is no trace in the Colorado form.

As a whole they are quite different looking insects, aside from the difference in markings, and, if I am correct in the identification of Harvey's species, there can be no doubt but that the Colorado ones are new.

Types : Glenwood Springs, Colo.

*Cucullia agua*, n. sp.—♂ *expanse*, 44 mm.; ♀, 46 mm.

General type of maculation recalling *convexipennis*, ground colour a rather clear bluish gray, with a faint reddish-brown flush, markings in brown varying in shade from light reddish through dark umber to almost black. Transverse lines almost obsolete. Extreme base of wing dark umber brown, with a small white spot next to costa. Inner margin with narrow dark brown, almost black, line. A prominent dash above inner angle of same colour, interrupted at its inner fourth by a pale lunule. A small blackish spot below costa, just before orbicular, and a larger, more diffuse one between reniform and orbicular from costa to median vein. The latter is continued as a faint shade obliquely to inner angle. The wing between this band and base is a rather clear gray, only very faintly tinged with reddish brown; beyond the band and above the median vein the wing is a light brown, slightly darker outwardly and above, the costa being, however, narrowly gray, with two or three pale dots and one or two outwardly oblique short black dashes. Beyond the band, below median vein the wing is gray but considerably washed with brown, especially outwardly. The veins, especially the median and its branches, are darkened. Orbicular small round, brown, with faint interrupted blackish limiting line. Reniform moderate in size, upright, kidney-shaped, limiting line dark umber brown, outwardly more blackish, inwardly fragmentary. The spot is not conspicuous, being concolorous with the brown subapical shade which embraces it. The t. a. line is almost obsolete, but on very close inspection it can be made out. It makes a wide, outwardly projecting

tooth below median vein. There is a dark brown interrupted terminal line. Fringe concolorous with adjacent portion of wing, paler at base. Hind wings soiled white, shading into fuscous outwardly, veins darkened, fringe white.

Beneath fore wings smoky, paler on inner half of inner margin, costa somewhat more gray. Quite a coating of long hairs on wing below costa over cell. Secondaries soiled white, darker outwardly and along costa. Palpi blackish outwardly, pale brown within. Head dark, black and gray mixed. Collar pale brown, largely mixed with gray, in front and through middle antero-posteriorly dark brown, almost black. A darker brown mesial band, narrowly edged with white anteriorly. Patagia gray, more or less edged with black. Abdomen fuscous. Fan-shaped dorsal tuft at base and two or three more rounded ones behind it, dark blackish gray. Thorax and abdomen beneath pale yellowish brown. Legs yellowish brown inwardly, more or less gray outwardly, tarsi darker brown.

♀ resembles ♂ closely, but fore wings are more obscured with dark blackish brown; the oblique median shade being much darker. Ordinary spots more contrasting and have dark brown centres. Hind wings darker, basal area more obscured.

Types: 1 ♂, 1 ♀. Huachuca Mts., Ariz. One specimen from Mr. Poling, the other of my own collecting.

(To be continued.)

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#### A SYNTOMID FAR AWAY FROM HOME.

I have on several occasions had specimens of both the European and Oriental cockroaches sent me by fruit dealers, who had found them on bunches of bananas, and there was a report of the capture of a large scorpion, said to be over five inches in length, on a bunch at Spokane, Wash., but the most interesting capture that I have to record is a beautiful freshly-emerged specimen of *Ceramidia Butleri*, Möschler, which I secured here last March. The specimen was sent to the U. S. Museum for identification, and Dr. Dyar writes me that it made a welcome addition to their cabinet, and cites Guatemala and the Amazons as its habitat.

J. WM. COCKLE, Kaslo, B. C.

## DESCRIPTIONS OF SOME NEW SPECIES OF TABANIDÆ.

BY C. P. WHITNEY, MILFORD, N. H.

*Chrysops lupus*, n. sp.—♀.—Length, 8–9 mm. Face shining yellowish ferruginous, callosities outside of suture, and cheeks black. Antennæ black, base of first joint fulvous. Front grayish pollinose, callosity black. Thorax black, with the usual glaucous stripes. Scutellum black. Abdomen yellow, first segment with a black spot wider anteriorly, and connecting on second segment with a subquadrate spot deeply emarginate posteriorly, which does not attain the posterior margin of the segment. The following segments have four large triangular black spots anteriorly, well separated from the posterior margins, and forming serrate bands on the fifth and sixth segments. Venter yellow, with transverse black spots increasing posteriorly. Legs black; front coxae, middle femora and tibiæ, distal half of posterior femora, posterior tibiæ and base of tarsi ferruginous.

Wings: root, costal cell, crossband and apical spot brown; first basal cell more than one-half infuscated, second at extreme base only. The crossband reaches the posterior margin only as a brown cloud on the last section of the fifth vein. The apical spot is broad in the distal end of the first submarginal cell and occupies as a brown shade about one-third of the apical part of the second submarginal, being almost disconnected from the crossband by the hyaline triangle which crosses the second longitudinal vein.

Hab.: Grand Lake, Col. Nine females collected by Mr. G. M. Dodge in August. Long's Peak, two females, Mr. E. A. Dodge, July.

The wing picture most resembles *hilaris*, O. S., of any eastern species, though the first basal cell is farther infuscated. The abdominal markings are somewhat like *callidus*, O. S., but the spot on second segment is shaped more as on *indus*, O. S.

*Chrysops Pikei*, n. sp.—♀. Length, 6–8 mm. Face yellow, the callosities infuscated outwardly. Antennæ slim, first joint yellow, second a little infuscated, the third blackish brown. Front yellow, with black callosity and ocellar space. Thorax black, with wide, well-defined stripes of greenish-yellow. Abdomen yellow, with two broad black median stripes the entire length, and two narrow abbreviated lateral stripes beginning on the third segment. The sixth segment is mostly black. Venter yellow, with slender furcate lateral lines and an abbreviated wider median stripe black. Legs yellow; distal part of anterior tibiæ, anterior and posterior tarsi infuscated.

July, 1904.

Wings: first basal cell completely infuscated, except a small apical hyaline spot contiguous to a basal one in the discal cell. The second basal cell is hyaline, except a slight proximal infuscation. The crossband reaches the hind margin, completely filling the fourth posterior cell. The fifth posterior cell is entirely hyaline, except for a slight but distinct cloud near the tip of the fifth vein, and which occasionally extends up the vein as a very faint shade. The hyaline triangle seldom reaches the second longitudinal vein and is broad and blunt at its extremity. The apical spot nearly fills the second submarginal cell and crosses the first posterior at its extremity.

Eleven females, collected by Mr. G. M. Dodge in Pike Co., Mo. One specimen has the front and dorsum of thorax dense black.

This species resembles *sequax*, Will., but the latter has the hyaline triangle narrower, arcuated, owing to the convex distal margin of the crossband, and it crosses the second vein.

*Tabanus benedictus*, n. sp.—♀. Length, 23–25 mm. Palpi slender, dark brown with appressed black hairs. Two basal joints of antennæ dark brown, third joint fulvous, the angle prominent. Eyes revived by moisture, purple, with two green bands. Front narrow, distinctly contracted anteriorly, dark brown; callus brown, twice as long as wide, with a fusiform prolongation above. Subcallus and face covered with dense yellow pollen. Thorax dark reddish-brown with a faint whitish median line. Abdomen black, pruinose. Legs black, base of tibiae dark reddish. Wings fuliginous; base, costal cell and stigma fulvous, brown clouds upon cross-veins and divarication of third vein. First posterior cell closed or nearly so.

Five females, Mr. G. M. Dodge, Pike Co., Mo., August.

This species may be easily recognized by its peculiar abdomen, which resembles that of *atratus*, F., its narrow front and closed first posterior cell.

*Tabanus (Thevioplectes) typhus*, n. sp.—♀. Length, 11–13 mm. Palpi yellow, long and tapering, with white and black hairs. Face and cheeks grayish, covered with white pollen and long white hairs. Antennæ fulvous; first two joints with black hairs, third joint with upper angle obtuse, the concave upper margin sometimes infuscated, the annular tip black. Eyes purple, with the green bands common to the subgenus. Front broad, whitish-gray, slightly contracted anteriorly, callus castaneous,

a darker lanceolate spot above, subcallus covered with white pollen. Thorax olive black, with three lighter lines, antealar tubercle rufous with black hairs. Abdomen rufous with a broad median black stripe broken by the white posterior margins of the segments. There are lateral rows of large, angular whitish spots with whitish hairs, resting on the posterior margins of the segments. Commencing on the second or third segment near the lateral margin are blackish spots, increasing posteriorly. The whitish margins expand medially into a row of very small triangles. Venter rufous, darker posteriorly with white margins. Legs fulvous, base of femora and tips of tibiae infuscated, tarsi black. Wings hyaline; stigma, costal cell and base luteous.

Six females, Milford, N. H., July.

This species is the size of *astutus*, O. S., but the latter has darker antennæ, the frontal callosity black, a more perceptible cloud on the divarication of the third vein, and the median row of abdominal spots much larger. The abdomen appears more tapering and the rufous tinge is wanting.

#### A NEW ICHNEUMON.

BY REV. THOMAS W. FYLES, LEVIS, QUEBEC.

*Amesolytus pictus*, n. sp.—Length of body, 8 mm.; length of antennæ, 4 mm.; expanse of wings, 13 mm.

Head: Clypeus white, pilose, somewhat mottled in appearance; mouth organs white; upper portions of the head black, except that on either side of the front there is a white line next the eye, and above the eye on either side a white semi-oval patch extending behind the ocelli. Eyes oval, large, protuberant, dark brown with a gloss. Ocelli jet black. Cheek, lower part white; upper part black. Antennæ: scape bead-like, jet black above, white beneath; pedicel jet black; flagellum 30-jointed, fuscous. Thorax: pronotum and upper parts black, set thickly with retrorse white hairs. On either side is a white line curving and widening above the first pair of legs, and then extending upward to the tegulae. Scutellum rather small, outlined with white; upper and lower edges slightly curved; sides somewhat indented. Post-scutellum has a short white line in the middle of the outer edge. Metathorax elongate, truncated behind. Under parts of thorax light red. Fore wings: costal nervure edged with setæ, basal nervure boldly curved, first transverse cubital nervure short and straight, second ditto wanting; submedian cell larger than the July, 1904.

median. Hind wings: costal cell of good size, cubital cell large; the transverse cubital nervure set well back, making the median cell to end with an angle. Legs: first pair small, third pair much larger than either the first or the second; coxae and trochanters light red; femora light red with pale yellow patches at the knees, the last pair much enlarged and curved like a bill-hook; tibiae white, very hairy; in the second pair of legs the tibiae have a black patch at the bottom, and in the third pair a black patch both at top and bottom; tibial spur large and white; tarsi, white, hairy, the lower half of last joint and claws black. Abdomen: Attached

to thorax by a short petiole slightly curving upward, clavate, 7-jointed, entirely black, punctured and pubescent.

I raised this very beautiful insect (Fig. 7, greatly enlarged) last year from *Meroptera pravella*, Grote, a leaf-crumper on the Sumach. Dr. Ashmead says of it: "*Amesolytus*, n. sp.—Quite different from the other species described in our fauna, which

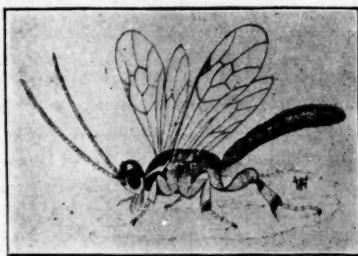


FIG. 7.

comes from Texas." I have deposited a type of the species in the National Museum at Washington.

#### A REVIEW OF OUR GEOMETRID CLASSIFICATION.

BY RICHARD F. PEARSALL, BROOKLYN, N. Y.

Since any work in this group must of necessity be a review of that done by the late Dr. Geo. D. Hulst, I want to state in this beginning of mine, that it is not to be regarded as a criticism.

Dr. Hulst made (for him) some curious errors, which will be noted later on, but the immense work he did in untangling the synonymy of this variable group, and in his two trips across the ocean to study the types, cannot be overestimated, and by it mine is rendered easy.

Not long since I made an attempt to rearrange my collection of Geometridæ in accordance with Dr. Hulst's classification of the group as given in Trans. Amer. Ent. Soc., Vol. 23, 1896, which was accepted as an authority, and followed without many changes by Dr. Dyar in his recent "List." Dr. Hulst divides the group into two great families, Geometrinæ and Ennominæ, based upon the development or absence of vein 5 in the

July, 1904.

hind wings. This leads to a natural division of the specific groups, and is a good starting point. The Geometrinæ he divides into eight subfamilies. One of these, Leuculinae, Dr. Hulst doubtfully classes as geometrid, and subsequently it proved to belong to the Liparidae. The Brephinae are in Dr. Dyar's "List" now placed as a subfamily at the end of the series of Ennominae. This cannot stand, since vein 5 is developed in all specimens of Brephos I have examined, and it must go, therefore, among the Geometrinæ, or be raised to family rank, as has been done in the case of another subfamily, the Strophidiinæ, now Epiplemidæ. I understand from Dr. Dyar that the manuscript for his list was prepared by Dr. Hulst, and unless the reasons for these changes are there given, I am not aware that they are to be found.

The subfamily Dyspteridinæ is founded upon the absence of the frenulum in certain species. This division is not warranted by the studies which I have made of Dr. Hulst's collection, now lodged in Rutgers College, New Brunswick, N. J., to which, through the courtesy of Prof. John B. Smith, I was granted free access, and of the collection which he gave to the Brooklyn Institute of Arts and Sciences, as well as my own material. Examination of the types of each genus show the following results as to the presence or absence of the frenulum in both sexes :

	Male.	Female.
Dyspteris . . . . .	absent.	absent.
Cysteopteryx . . . . .	not a valid genus.	
Nyctobia . . . . .	present.	a tuft of stiff hairs.
Cladara . . . . .	absent.	absent.
Opheroptera . . . . .	present.	wings aborted.
Paraptera . . . . .	present.	" " "
Rachela . . . . .	present.	" " "

Such a showing should, in my opinion, eliminate this subfamily, whose affiliations are with the Hydriomeninæ, and necessitate a reorganization of the latter subfamily, which constructive work I intend to take up later on, after making a comparison of every generic type, with its description. That these descriptions contain many errors, I have already discovered. How far they may affect the general scheme of arrangement, as followed by Dr. Hulst, it is impossible to say as yet, but his arrangement of the species commends itself to me, after some study of the related forms, and it may not be necessary to greatly alter it. I sincerely hope this may be so, because I appreciate the labour bestowed upon this group by Dr. Hulst, when it was in a chaotic condition.

In this connection I may refer to a recently published query by the Rev. G. W. Taylor, concerning *Agia eborata*, Hulst., and its supplemental note by Dr. Dyar. They cite *viridata*, Packard, as the type of *Cysteopteryx*. This species was not used by Dr. Hulst as the type of *Cysteopteryx* (see Trans. Am. Ent. Soc., Vol. 23, p. 250), for *Agia eborata*, Hulst, is undoubtedly a synonym of *Lobophora viridata*, Packard, and its structural characters are widely at variance with Dr. Hulst's generic description of *Cysteopteryx*. In founding the genus *Cysteopteryx*, he gives as the type *viridata*, Grote (not Packard). I have been unable to find any description of such a species (it would probably be called a *Lobophora*), nor does it appear in the old Brooklyn Check List, or in Grote's Check List of 1882. In the Brooklyn Institute collection there is, however, a male specimen from New Hampshire, labeled *Cysteopteryx viridata*, Grote, in the handwriting of Dr. Hulst. It is a varietal form of *Nyctobia limitata*, Walk., and though the end spurs and tarsi are broken off, in the one hind leg remaining it still bears the hair pencil so curiously occurring in this group, referred to by Dr. Hulst under his detailed generic description of *Nyctobia*. It has two accessory cells in the fore wings, not one, and in this agrees also with *Nyctobia* as defined. In the Hulst collection at Rutger's College is a single male specimen labeled *Cysteopteryx*, which is also, in my opinion, one of the varieties of *Nyctobia limitata*, Walk., but it has the hair pencil and one accessory cell. Now, in my collection, seventeen specimens of the latter species divide in this respect as follows :

One accessory cell—2 males, 8 females.

Two accessory cells—5 males, 2 females.

The genus *Cysteopteryx* therefore should fall. That this showing should make it necessary to abandon the use of the accessory cell as a means to generic division, I do not admit. It only proves in this species to be a variable quantity. Nature follows no hard and fast lines. I recognize that it is no light matter thus to upset an established order of things, but facts must be recognized and dealt with, even if they create temporary disturbance.

NOTE.—Since writing the above, I have sent to Mr. Samuel Henshaw, Museum of Comparative Zoology, Cambridge, Mass., a specimen of *Agia eborata*, Hulst, which he has kindly compared for me with the type of *Lobophora viridata*, Packard. He writes: "Your specimen is identical with Packard's type of *Lobophora viridata*."

A NEW GELECHIID, *TRICHOTAPHE LEVISELLA*, N. SP.

BY REV. THOMAS W. FYLES, LEVIS, QUEBEC.

The Broad-leaved Aster (*Aster macrophyllus*, L.) grows in patches of considerable size in the woods around Levis. In the month of June, 1902, I noticed that many of the large ground leaves of the plant were folded over from both sides and crinkled. On opening one of them I found that a larva had turned the leaf into a cool and pleasant tent for itself, and was feeding upon the parenchyma of the leaf.

This larva was about nine lines in length. It was of a pale green, with dorsal, subdorsal and side lines of darker green. The head and second segment were jet black and glossy. The fore part of the third segment was dull brown, on the after part of it were four conspicuous white patches. At intervals, along the subdorsal lines, and elsewhere on the body, were round jet black dots. The spiracles were black. The under side of the larva was pale green. The claspers and anal segment were marked with black.

On the 25th of the month mentioned the larva spun a capsule-like white cocoon, open at one end for the exit of the moth. Its plan was to place itself on the under side of a fresh leaf, upon the midrib; then to affix its threads at a certain distance on either side of the rib, and to draw so much of the leaf as lay between into a fold or crease. Within this it formed its cocoon.

The moths appeared on the 10th of the next month. The perfect insect when displayed measured ten and a half lines across. Its body was four lines in length, and its antennæ three lines. The palpi were dark brown, turned back usually. The basal part of them was spindle-shaped; the terminal joint was smaller, long and pointed. The fore wings were brown, clouded with darker brown towards the hind margin. They had a subterminal line of paler brown spots, bordered with black. Beyond the centre of the wings was a pale brown horseshoe-like mark, not very distinct. The secondaries were gray, with a lighter well-marked terminal line, and a gray fringe. The body was tufted at the extremity. The tarsi were ringed with white.

Professor Fernald and Mr. August Busck informed me that the moth belongs to the genus *Trichotaphe*, Clemens. I have named it *Trichotaphe Levisella*, and I have sent types of it to the U. S. National Museum. July, 1904.

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BOOK NOTICE.

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The Carnegie Museum has just issued a magnificent volume of over 300 pages, by Dr. Wm. H. Ashmead, on the Classification of the Hymenopterous Superfamily Chalcidoidea. (Classification of the Chalcid Flies of the Superfamily Chalcidoidea. Mem. Carnegie Museum, Vol. 1, No. 4, pp. 326 + XII., pls. 9. Jan., 1904.)

The work is divided into two parts, the first of which includes tables for the separation of all the known genera in the group, while the second deals with the species occurring in South America.

Fourteen families of Chalcids are recognized and over six hundred genera. Many of the latter are characterized for the first time in the present work. Under each family and tribe is given a brief consideration of the affinities and general habits of the respective groups. These are of material aid to the student in identifying specimens by means of the dichotomies.

A good idea of the extreme completeness with which the work has been done may be gathered from the fact that, in the entire complex, there are only six genera which are unknown to the author and not classified.

The second part of the paper includes descriptions of nearly 200 new species of South American Chalcids and a complete synominal catalogue of all the species from that continent, besides tables for the determination of the species in some of the larger genera.

It is to be hoped that the appearance of this work will give an impetus to the collecting and studying of this economically very important group. Dr. Ashmead may most certainly be congratulated on having done his share in placing the classification within easy attainment and giving at the same time one of the most important contributions on American Hymenoptera ever published.

It may also be mentioned that the volume is very nicely printed and quite free from typographical errors. The nine plates which accompany it include well-executed figures of some fifty South American genera.

C. T. B.

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Mailed July 4th, 1904.

